



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|---|------------------|--|
| <p>(51) International Patent Classification 7 : B26D 1/10, B65B 69/00, B65H 73/00</p> | <p>A1</p> | <p>(11) International Publication Number: WO 00/62981</p> <p>(43) International Publication Date: 26 October 2000 (26.10.00)</p> |
| <p>(21) International Application Number: PCT/SE00/00711</p> <p>(22) International Filing Date: 14 April 2000 (14.04.00)</p> <p>(30) Priority Data: 9901393-0 19 April 1999 (19.04.99) SE</p> <p>(71) Applicant (for all designated States except US): CORE LINK AB [SE/SE]; Box 198, S-311 22 Falkenberg (SE).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): ESPING, Thomas [SE/SE]; Lundbergsgatan 20, S-311 45 Falkenberg (SE). GÖRANSSON, Jan [SE/SE]; Ångsvägen 18, S-310 44 Getinge (SE). JOHANSSON, Kjell [SE/SE]; Birgers väg 19, S-311 38 Falkenberg (SE). KARLSSON, Jan [SE/SE]; Kaninvägen 6, S-311 41 Falkenberg (SE). LJUNGEK, Göran [SE/SE]; Hagarna, S-305 92 Holm (SE). NILSSON, Ove [SE/SE]; Fylkesvägen 8, S-311 38 Falkenberg (SE).</p> <p>(74) Agent: NILSSON, Lennart; Lennart Nilsson Patentbyrå AB, Box 271, S-311 23 Falkenberg (SE).</p> | | <p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report. In English translation (filed in Swedish).</p> |
| <p>(54) Title: DEVICE FOR EMPTYING</p> <div> </div> <p>(57) Abstract</p> <p>The present invention relates to an apparatus for emptying reels, e.g. broke reels, in which the material is fine paper, paperboard, tissue, plastic, etc., a knife (12) being displaceable reciprocally over the reel (9) in the longitudinal direction thereof for progressively cutting through the material layers for emptying the reel and possibly exposing the sleeve of the reel (9).</p> | | |

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | | | | | | | |
|----|--------------------------|----|--|----|--|----|--------------------------|
| AL | Albania | ES | Spain | LS | Lesotho | SI | Slovenia |
| AM | Armenia | FI | Finland | LT | Lithuania | SK | Slovakia |
| AT | Austria | FR | France | LU | Luxembourg | SN | Senegal |
| AU | Australia | GA | Gabon | LV | Latvia | SZ | Swaziland |
| AZ | Azerbaijan | GB | United Kingdom | MC | Monaco | TD | Chad |
| BA | Bosnia and Herzegovina | GE | Georgia | MD | Republic of Moldova | TG | Togo |
| BB | Barbados | GH | Ghana | MG | Madagascar | TJ | Tajikistan |
| BE | Belgium | GN | Guinea | MK | The former Yugoslav Republic of Macedonia | TM | Turkmenistan |
| BF | Burkina Faso | GR | Greece | ML | Mali | TR | Turkey |
| BG | Bulgaria | HU | Hungary | MN | Mongolia | TT | Trinidad and Tobago |
| BJ | Benin | IE | Ireland | MR | Mauritania | UA | Ukraine |
| BR | Brazil | IL | Israel | MW | Malawi | UG | Uganda |
| BY | Belarus | IS | Iceland | MX | Mexico | US | United States of America |
| CA | Canada | IT | Italy | NE | Niger | UZ | Uzbekistan |
| CF | Central African Republic | JP | Japan | NL | Netherlands | VN | Viet Nam |
| CG | Congo | KE | Kenya | NO | Norway | YU | Yugoslavia |
| CH | Switzerland | KG | Kyrgyzstan | NZ | New Zealand | ZW | Zimbabwe |
| CI | Côte d'Ivoire | KP | Democratic People's Republic of Korea | PL | Poland | | |
| CM | Cameroon | KR | Republic of Korea | PT | Portugal | | |
| CN | China | KZ | Kazakstan | RO | Romania | | |
| CU | Cuba | LC | Saint Lucia | RU | Russian Federation | | |
| CZ | Czech Republic | LJ | Liechtenstein | SD | Sudan | | |
| DE | Germany | LK | Sri Lanka | SE | Sweden | | |
| DK | Denmark | LR | Liberia | SG | Singapore | | |
| EE | Estonia | | | | | | |

DEVICE FOR EMPTYING

The present invention relates to an apparatus according to the preamble to appended Claim 1.

5

In the manufacture of web-shaped material on reels, it is relatively often necessary to reject a number of reels and take care of returned reels which are damaged in one way or another and which will not be accepted by customers. Such reels become broke reels and are to be emptied of the material proper which is to be recycled by, for example, being comminuted and dissolved into pulp in order later
10 to become new paper. The core of the reel in the form of a sleeve is to be taken care of and re-used. The reason for this is that it is not desirable to comminute and dissolve the sleeve material, since this should not be included in the pulp. Prior art reel dividers or guillotines have proved to suffer from drawbacks in the form of,
15 among other things, complex design and construction, lack of versatility, and above all high costs, as well as the fact that they often damage the sleeve (the core) so that this cannot be re-used.

The task forming the basis of the present invention is to realise a novel apparatus
20 of the type disclosed by way of introduction.

This task is solved according to the present invention in that the apparatus described by way of introduction has been given the characterising features as set forth in the characterising clause of appended Claim 1.

25

The present invention realises an apparatus which is relatively simple from the design and construction point of view, and which has proved to be extremely efficient and versatile. The apparatus according to the present invention is extremely simple to adapt to different types of material varieties, e.g. fine paper,
30 paperboard, tissue, plastic, and foils of types such as aluminium foil. The relatively simple design and construction moreover guarantee a high dependability and simple maintenance.

The present invention will now be described in greater detail hereinbelow, with reference to the accompanying Drawings. Fig. 1 is a schematic, perspective view of one embodiment of an apparatus according to the present invention. Fig. 2 is a view similar to that of Fig. 1 of another embodiment of an apparatus according to the present invention. Fig. 3 is a schematic view of a shuttle carriage for an apparatus according to the present invention. Fig. 4 is a schematic view of one embodiment of a part of an apparatus according to the present invention.

The embodiment of an apparatus according to the present invention schematically illustrated in Fig. 1 has a frame 1 in the form of an inverted U with feet 2, 3, 4 and 5. Between the vertical shanks in the frame 1, a beam or boom 6 extends which is displaceable up and down in the frame 1. The beam or boom 6 carries side supports 7 and 8 which are displaceable in the longitudinal direction of the boom or beam 6 for adapting to each end of a paper reel 9 which is placed in the frame 1 and may rest on a per se conventional pallet 10. After placing of the side supports 7 and 8 against the ends of the paper reel 9, it is appropriate to lock the side supports 7 and 8 in the desired position.

A shuttle-like carriage 11 is displaceable reciprocally on the boom or beam 6 between the side supports 7 and 8. The carriage 11 supports a roller knife 12 and a plough 13 with two flaps 14 and 15. The plough 13 is double-directed and the flaps 14 and 15 are adjustable for adaptation to the direction of movement of the plough 13 and the carriage 11.

In Drawing Figure 1, the parts are shown with the roller knife 12 during cutting work on movement from left to right on the reel 9. The layers or sheets cut through during the preceding stroke have already fallen down onto the pallet 10. The boom or beam 6 is fed progressively down towards the centre of the reel 9. This downward movement ceases when the sleeve in the reel 9 is reached, whereafter the pallet 10 with the severed sheets is conveyed off for recycling to the process. The sleeve is taken care of for possible re-use. The beam or boom 6 is returned to its starting position, whereafter a new reel may be placed in the frame

1. The beam or boom 6 is displaceable by means of screws or the like disposed in the frame legs.

In the embodiment of the present invention illustrated in Fig. 2, the frame 1 is disposed on a leg 16 on the one side of the reel 9 and a leg 17 on the other side of the reel 9. In the legs 16 and 17, there are provided pins 18 for engagement in the sleeve of the reel 9 and lifting it up towards the shuttle carriage 11 with the roller knife 12 and the plough 13. In this embodiment, the severed sheets are deposited below the reel 9 and may be transported off in any suitable manner. Possibly, a conveyor may be provided for possible continuous removal of the sheets.

Drawing Figure 3 shows the carriage 11 in greater detail with the knife 12, the plough 13 and the flaps 14 and 15. It has proved to be suitable that the roller knife 12 rotates when cutting such web-shaped material as fine paper and paperboard, while the roller knife 12 may suitably be stationary when cutting such material qualities as, for example, tissue. The carriage 11 is suitably connected to a linear prime mover, for example a pneumatic cylinder, a so-called shuttle cylinder, for reciprocal displacement between the ends of the reel 9. Suitably, the roller knife 12 is freely running, but it may be both stationary and driven, depending upon the different material qualities. Fig. 3 illustrates more closely that the flaps 14 and 15 are secured on the plough 13 with the aid of hinges 19 centrally positioned on the plough 13 and permitting pivoting of the flaps 14 and 15 from the position illustrated in Fig. 3 to the position illustrated in Figs. 1 and 2.

The roller knife 12 is mounted on a hub or shaft 20 at the end of a swing or end walls forming the shuttle carriage 11. The swing may be pivotal in the direction of the arrows thereon in Fig. 3 for angular positioning of the roller knife 12 and the plough 13 in relation to the longitudinal axis of the reel 9. The roller knife 12 may, as was mentioned above, be freely rotated, driven or locked, depending upon the material variety on the reel 9. The shuttle carriage 11 may be mounted on a shuttle piston in a shuttle cylinder. Such an arrangement is exemplified in Fig. 4 which will be described in greater detail below. The plough 13 may be suspended in bolts which extend from a plate which is connected to the shuttle carriage 11

with the aid of a carrier or stub shaft. With the aid of the bolts, it is possible to adjust the plough in relation to the roller knife 12. The flaps 14 and 15 may be switchable with the aid of pistons which are suitably of the pneumatic type.

- 5 The arrangement exemplified in Fig. 4 displays a shuttle cylinder 27 with three pistons 28, 29 and 30. The piston 29 supports the shuttle 11 with the roller knife 12, while the side supports 7 and 8 are mounted on the pistons 28 and 30, respectively, the side supports 7 and 8 being urged against each end of the reel 9. The pistons 28, 29 and 30 divide the shuttle cylinder 27 into four chambers 31, 32, 10 33 and 34. When the chambers 31 and 34 are pressurised, the side supports 7 and 8 are urged against the ends of the reel 9. A somewhat lower pressure in the chamber 32 will displace the piston 29 with the shuttle 11 and the roller knife 12 from the piston 28 towards the piston 30. When the roller knife 12 has reached or passed the end of the paper reel 9, the pressurisation is switched from the chamber 15 32 to the chamber 33 and the flaps 14 and 15 are switched for displacement of the roller knife 12 towards the piston 28, and thereby the other end of the reel 9. As previously, the cylinder 27 is progressively displaced towards the reel 9 in suitable cutting depths, or the reel 9 is displaced upwards towards the cylinder 27.
- 20 When cutting such a material variety as tissue, it has proved to be suitable to maintain the roller knife 12 stationary and employ air jets as the plough instead of the mechanical plough 12 with the flaps 14 and 15 described in the foregoing.

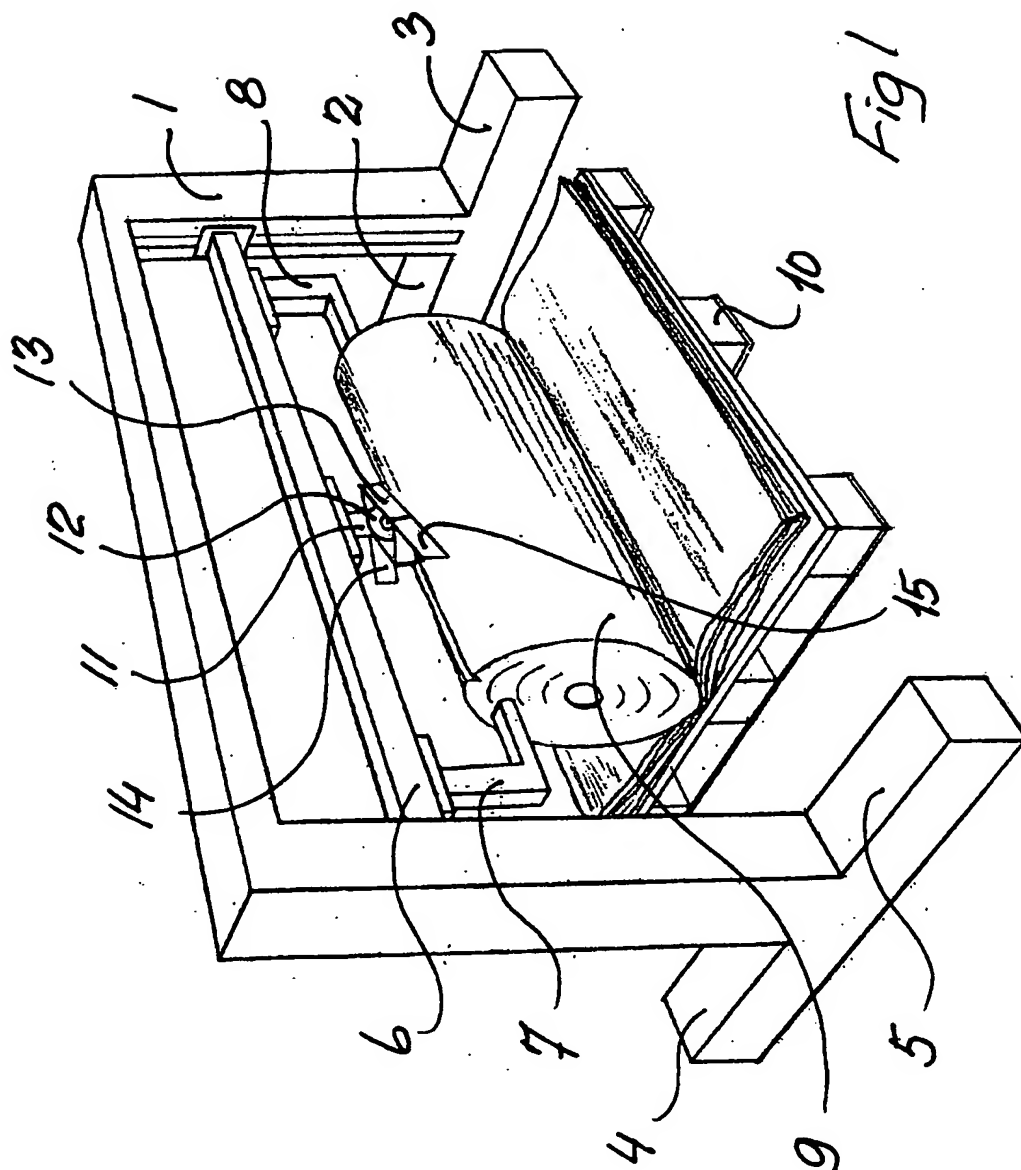
Many modifications are naturally possible without departing from the scope of the 25 inventive concept as defined in the appended Claims.

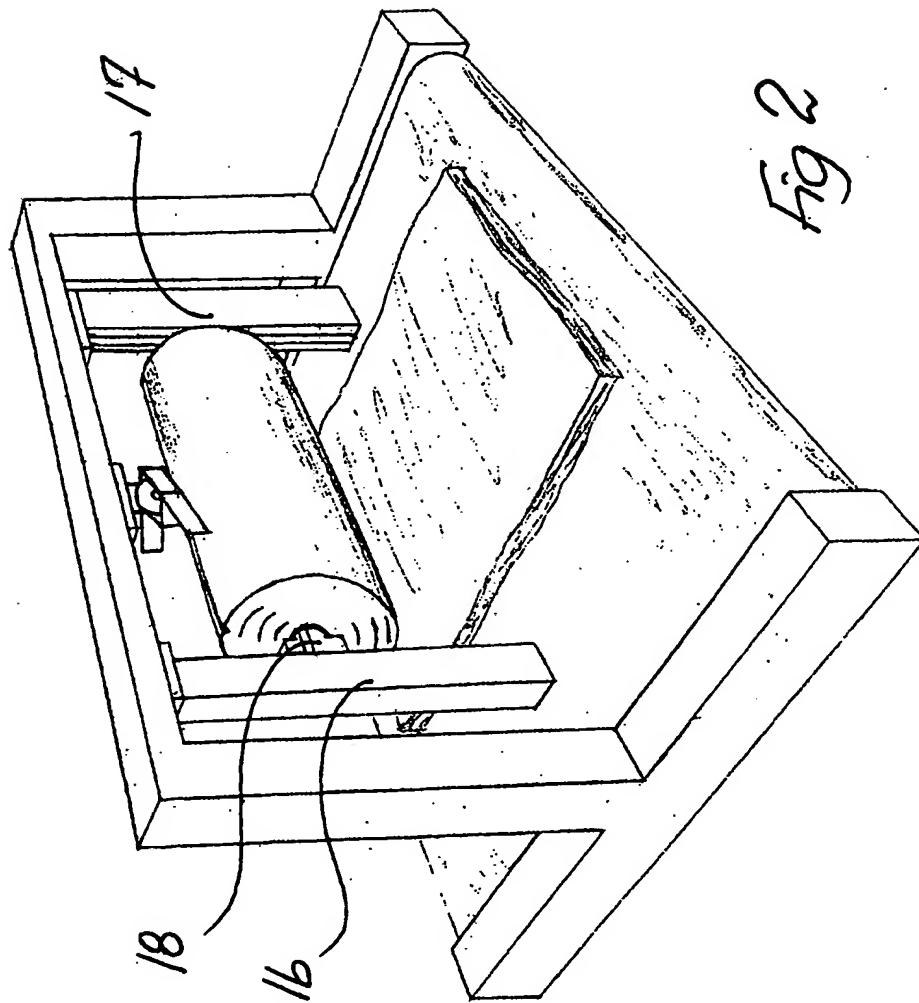
CLAIMS

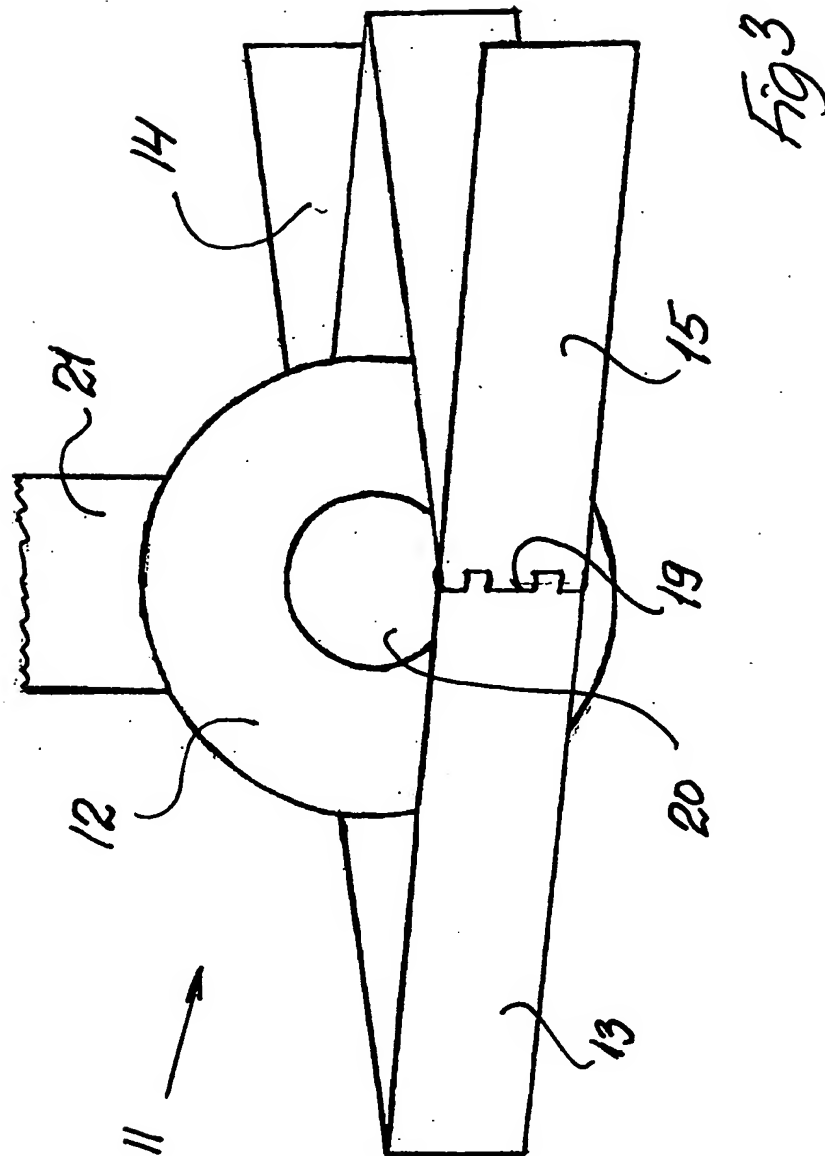
1. An apparatus for emptying reels, e.g. broke reels, on which the material is fine paper, paperboard, tissue, plastic etc., **characterised in that** a knife (12) is
5 displaceable reciprocally over the reel (9) in the longitudinal direction thereof for progressively cutting through the material layers, for emptying the reel and possibly exposing the sleeve of the reel (9).
2. The apparatus as claimed in Claim 1, **characterised in that** the knife is a
10 roller knife (12) which is rotatably or fixedly mounted in a shuttle-like carriage (11) which is displaceable reciprocally between the ends of the reel (9).
3. The apparatus as claimed in Claim 1, **characterised in that** means (13, 14, 15) are provided to remove cut layers away from the knife or cutting region so
15 that same leave the reel (9).
4. The apparatus as claimed in Claim 3, **characterised in that** said means (13, 14, 15) are mounted on the carriage (11) together with the roller knife (12).
- 20 5. The apparatus as claimed in Claim 3 or 4, **characterised in that** said means (13, 14, 15) are one or more aspirator nozzles for blowing the severed material layers or sheets each in their direction from the cutting region.
6. The apparatus as claimed in Claim 3 or 4, **characterised in that** said
25 means are in the form of a plough (13) which presses the severed material layers or sheets in each direction away from the cutting region.
7. The apparatus as claimed in Claim 6, **characterised in that** the plough (13) is double-directed.
30
8. The apparatus as claimed in Claim 6 and/or 7, **characterised in that** the plough (13) is provided with flaps (14, 15) for broadening thereof.

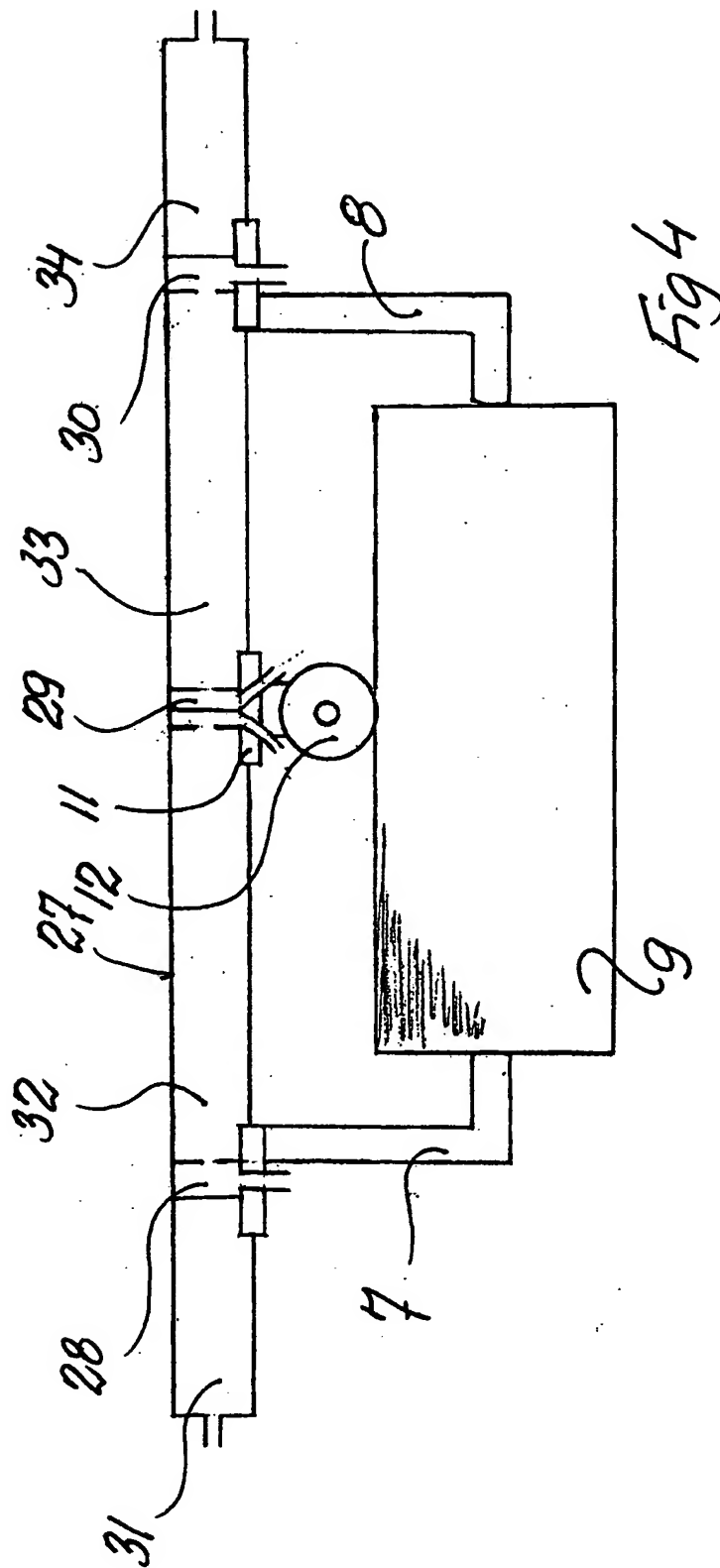
9. The apparatus as claimed in Claim 8, **characterised in that** the flaps (14, 15) are switchable for adaptation to the direction of movement of the plough (13).
10. The apparatus as claimed in Claims 1, 2 and/or 3, **characterised in that**
5 the shuttle-like carriage (11) with the roller knife (12) and said plough means (13, 14, 15) is disposed in a shuttle beam (27) which is displaceable from a starting position towards the centre of the reel (9) or sleeve and back to the starting position, while the roller knife (12) is displaced reciprocally over the reel (9).
- 10 11. The apparatus as claimed in Claim 10, **characterised in that** the shuttle-like carriage (11) is displaceable between the ends or sides of the reel (9) by means of central piston (29) in a cylinder (27), preferably a pneumatic cylinder, with an additional piston (28, 30) for each side support (7, 8), pressurisation of
15 end chambers (31, 34) entailing displacement of the side supports (7, 9) to the ends of the reel (9), whereafter alternating pressurisation of the chambers (32, 33) on each side of the central piston (29) entails displacement of the shuttle-like carriage (11) with the roller knife (12) and the plough (13) between the ends or sides of the reel (9).

.....









INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/00711

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B26D 1/10, B65B 69/00, B65H 73/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B26D, B65B, B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| X | US 4864906 A (HALL), 12 Sept 1989 (12.09.89), column 2, line 13 - line 46, figure 2 -- | 1,2 |
| X | US 5759350 A (PYRON ET AL.), 2 June 1998 (02.06.98), column 2, line 36 - column 3, line 59, figures 3,7,9, claim 1 -- | 3,4,5 |
| A | US 3605542 A (W.G.S. SMITH ET AL.), 20 Sept 1971 (20.09.71) -- | 1-11 |
| A | US 4506575 A (MCCAY ET AL.), 26 March 1985 (26.03.85), figures 1-5, abstract -- | 1-11 |

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

| | |
|---|--|
| * Special categories of cited documents | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "A" document defining the general state of the art which is not considered to be of particular relevance | "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "E" earlier document but published on or after the international filing date | "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family |
| "O" document referring to an oral disclosure, use, exhibition or other means | |
| "P" document published prior to the international filing date but later than the priority date claimed | |

| | |
|--|---|
| Date of the actual completion of the international search | Date of mailing of the international search report |
| 3 July 2000 | 26 -07- 2000 |
| Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86 | Authorized officer KATARINA EKMAN/ipn Telephone No. +46 8 782 25 00 |

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/00711

| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|---|--|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| A | US 4597820 A (NOZAKA), 1 July 1986 (01.07.86), column 3, line 32 - line 35, figure 2, abstract -- | 1-11 |
| A | GB 1131567 A (WILLIAM CORDINGLEY ALLEN), 23 October 1968 (23.10.68), figures 1,2 -- | 1-11 |
| A | GB 1531112 A (INDUSTRIAL RESEARCH & ENGINEERING INC.), 1 November 1978 (01.11.78) -- ----- | 1-11 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No.

PCT/SE 00/00711

| Patent document cited in search report | | | Publication date | Patent family member(s) | Publication date |
|--|---------|---|------------------|-------------------------|------------------|
| US | 4864906 | A | 12/09/89 | NONE | |
| US | 5759350 | A | 02/06/98 | NONE | |
| US | 3605542 | A | 20/09/71 | GB 1241323 A | 04/08/71 |
| US | 4506575 | A | 26/03/85 | NONE | |
| US | 4597820 | A | 01/07/86 | EP 0129238 A | 27/12/84 |
| | | | | JP 1439432 C | 19/05/88 |
| | | | | JP 60002553 A | 08/01/85 |
| | | | | JP 62046458 B | 02/10/87 |
| | | | | US 4555288 A | 26/11/85 |
| GB | 1131567 | A | 23/10/68 | NONE | |
| GB | 1531112 | A | 01/11/78 | CA 1058508 A | 17/07/79 |
| | | | | FI 61650 B,C | 31/05/82 |
| | | | | FI 770187 A | 24/07/77 |
| | | | | JP 1320146 C | 29/05/86 |
| | | | | JP 52144887 A | 02/12/77 |
| | | | | JP 60040359 B | 10/09/85 |
| | | | | SE 430961 B,C | 27/12/83 |
| | | | | SE 7700544 A | 24/07/77 |
| | | | | US 4020726 A | 03/05/77 |